

Preface

Catchment hydrology and in particular runoff generation processes, form a core area of hydrological research. Yet, dividing precipitation into parts which yield different runoff components is not adequately understood. Since the quality of surface water and groundwater depends largely on the interaction between surface runoff, soil water and groundwater, there is a strong demand for studies into runoff generation processes and watershed modelling.

Until now, the lateral flow in a basin has only been partially considered. The description of lateral flow processes is an important and necessary step for quantifying key runoff mechanisms. Hydrologists struggle with the gap that exists between tracing lateral flow and a sound physically-based description of subsurface water movement. Integration of calibrating and validating strategies as well as further consideration of new forms of experimental data, help to reduce uncertainty in modelling.

Our challenge in the future is to model adequately the dominating runoff generation processes at the meso- and macroscale in order to meet future water resources management needs. Therefore better process-oriented modelling is needed. The model uncertainties have to be minimized using new and independent validation strategies, such as tracing, remote sensing and new hydrometric techniques.

The symposium seeks to explore the linkages between tracer techniques and hydrometric approaches to understand hydrological processes in catchments. In particular, the collection of papers demonstrate how advanced hydrometric techniques can be used to complement tracer experiments which can be seen in a black-box (input–output) context and show how tracers can be used as calibration and validation tools in hydrological modelling. Tracer techniques and remote sensing have become important tools in catchment hydrology. While remote sensing is mainly used to address surface parameters, tracers have been useful for quantifying sources of streamflow, groundwater residence times and surface and subsurface flow paths. Nevertheless, little integration of tracer techniques with remote sensing and advanced hydrometric techniques has been attempted.

The aim of the International Symposium on Integrated Methods in Catchment Hydrology, held during the XXII General Assembly of the International Union of Geodesy and Geophysics at Birmingham in July 1999 is to provide a forum to present and discuss both the methodological aspects of integrated methods in catchment hydrology and the present state of progress in catchment research. This proceedings volume includes 34 oral and poster papers on a wide range of scientific issues associated with the field of catchment hydrology. Presentations include methodological studies on catchment hydrology using hydrometric, remote sensing and tracer approaches. The integrated use of available advanced techniques in catchment hydrology is the

main issue of the symposium and many papers deal with several techniques in an integrated way.

The symposium was organized by the International Committee on Tracers (ICT) and promoted jointly by all Commissions and Committees of the International Association of Hydrological Sciences (IAHS).

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